

# PATENT SPECIFICATION

DRAWINGS ATTACHED

856,569



*Date of Application and filing Complete Specification:*  
March 10, 1958.

*No.* 7541/58.

*Application made in Germany on April 11, 1957.*

*Complete Specification Published December 21, 1960.*

**Index at Acceptance:** Class 65(2), F(1G:3CX:3M9).

**International Classification:** F06b.

## Improvements in or relating to articulated shoring for use underground.

### COMPLETE SPECIFICATION

I, FRIEDRICH WILHELM PAURAT, a citizen of the Federal Republic of Germany, of 2 Mulheimer Strasse, Duisberg, Germany, do hereby declare the invention, for which I  
5 pray that a Patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:

This invention relates to articulated  
10 shoring for use underground of the type including at least one joint comprising a part-cylindrical socket on at least one of the shoring members to be jointed and a pivot pin with a corresponding cylindrical  
15 surface, either the pin being secured to the other of the members to be jointed or such other member also having a similar socket. To secure the assembled joint against flexural moments acting transversely in  
20 respect of the joint axis and against shearing stresses, safety devices are used, these usually consisting of shackles that bridge the joint on both sides and are themselves pivoted to the members of the shoring to be  
25 jointed. Another form of safety device consists of cups, each screwed or otherwise secured to one end of the pivot pin and embracing the projecting ends of socket parts of the two members fitted to the pin.  
30 Safety devices of this kind are cumbersome and require the use of bolts, keys, or other devices for fixing them to the parts of the joint. These fixing means, moreover, are usually very difficult to undo, particularly  
35 if corrosion, such as rusting, has occurred.

The object of the invention is to provide a joint for articulated shoring for use underground with safety devices that can be applied in a simple manner without the use  
40 of bolts, keys, or similar fixing appliances, that serve effectively as stress-absorbing elements, and that can be readily dismantled for withdrawal of the shoring.

According to the present invention, a joint  
45 for articulated shoring for use underground

(Price 3s. 6d.)

comprises on at least one of the members to be jointed a part-cylindrical pivot socket to fit the corresponding cylindrical surface of a pivot pin that is either secured to the other of the members to be jointed or serves  
50 to fit also another part-cylindrical pivot socket on such other member, together with two ring-like safety members each adapted to be applied to one of the ends of the pin-  
55 and-socket assembly and there to embrace loosely projections on each of the two members to be jointed, so as to prevent any appreciable relative displacement of the two members in directions transverse to the axis  
60 of the pivot, whilst permitting articulation of the members above that axis.

The projections to be embraced by the ring-like safety members may be formed by the projecting ends of a pivot pin that is  
65 secured to one of the members to be jointed, and by abutments formed for the purpose on the other of such members.

Again, projections to be embraced by the ring-like safety members may be formed by the projecting ends of socket parts of the  
70 two members to be jointed, or by reinforcing abutments applied to the projecting ends.

Alternatively, the projecting ends of socket parts of the two members to be  
75 jointed may carry retaining members to prevent axial displacement of a pivot pin fitted between the two sockets, when the retaining members constitute the projections  
80 to be embraced by the ring-like safety members.

Means are preferably provided to prevent accidental removal of the safety members from the projections. Thus, the projecting  
85 ends of socket parts, and any reinforcing abutments of such parts, may have holes to receive a split pin outside each applied safety member. In conjunction with such  
90 provision for split pins on the socket part of one of the members to be jointed, the

Price 4s 6d.

projecting ends of the socket part of the other member may have integral (including welded) lugs to lie outside the safety members. Again, the end of the pivot pin may be provided with retaining discs larger in diameter than the bores of the ring-like safety members, bayonet-connections between the pin and the discs providing for application and removal of the latter.

The ring-like safety members may be circular, oval, or otherwise. Because of their closed ring shape, they are at all times suitable for taking up large stresses without deformation, yet sufficient play can be provided, or provision made for the insertion of reinforcing abutments that it is possible to dismantle the joint by displacing the jointed members in relation to one another to such a degree that at least one of the safety members can be liberated first and then the other.

The invention will now be described with reference to the accompanying drawings, which show by way of example several embodiments of the invention. In the drawings

Figure 1 is a longitudinal section through one form of joint for articulated shoring;

Figure 2 is an exploded perspective view of the joint of Figure 1;

Figure 3 is a perspective view of a joint for a shoring prop with a cap shoe;

Figure 4 is a longitudinal section through another form of joint for articulated shoring, with a safety device against shearing stresses;

Figure 5 is a longitudinal section through yet another form of joint for articulated shoring;

Figure 6 is a longitudinal section through a still further form of joint for articulated shoring; and

Figure 7 is a side view of the jointed shoring of Figure 6.

In the drawings, like reference numerals are used throughout, where applicable.

In Figures 1 and 2, rolled sections 1a and 1b of shoring for use underground are connected together by an articulated joint consisting of socket parts 2a, 2b welded to the sections 1a, 1b respectively, and a pivot pin 2c, and are secured against flexural moments acting transversely to the joint pivot 2c and against shearing stresses by safety devices consisting of ring-shaped safety members 3a, 3b embracing the two socket parts. Reinforcing abutments 4a are fitted over the projecting ends of the socket parts, and the rings 3a, 3b can be slid with slight play on to the abutments 4a, and then retained by split pins 5 through the ends of one of the socket parts, which pins also retain the pin 2c against axial removal. Lugs 4b welded to the other socket part assist in retaining the rings. The rings 3a, 3b being retained

against all but slight axial displacement, and the play round the abutments 4a being slight, the rings can resist large stresses arising in the joint otherwise than by simple pivoting of the joint, which is not interfered with by the rings. However, the play is such that the joint can readily be dismantled for withdrawal of the shoring.

In Figure 3, the pivot pin 2c is welded along its under side to the top plate 1c of a shoring prop 1a and projects beyond both sides of the plate 1c. The upper ends 3c of ring-like safety members 3a, 3b are bent over to rest on a cap shoe 6 (provided with a recess 6a to receive the cap, which is not shown) so as there to embrace projections 6b welded to the shoe, while the lower parts of the safety members embrace the projecting ends of the pin 2c and overhang the plate 1c.

In Figure 4, a collar 7 on a pivot pin 8 fits into recesses in sockets 9a, 9b, to receive shearing stresses, whilst the flexural moments acting transversely in relation to the pin are taken up by the ring-shaped safety members 3a, 3b. The latter are retained by long split-pins 10a, 10b, which are not subjected to stress. Instead of the collar 7, the socket parts 9a, 9b may be fitted with ring segments to fit into a recess in the pin 8.

In Figure 5, the pivot pin 2c is contained inside a cylinder 2d, the ends of which are closed by plates 2e with holes for the passage of bayonet-joint ends 11 of the stems of retaining discs 12a, 12b. After application of the rings 3a, 3b to the assembled joint, simple application of the discs 12a, 12b prevents their accidental removal, the discs having a diameter greater than the bore of the rings.

In Figures 6 and 7, two half-rings 14a, 14b, fit round each end of the pivot pin 8 and have internal ribs 13 to engage corresponding grooves in the pin, thus constituting retaining members to prevent axial removal of the pin. They also form projections to receive the safety rings 3a, 3b, which take up the flexural stresses. The rings 3a, 3b, 14a, 14b are retained by safety pins 15 (one only shown).

#### WHAT I CLAIM IS:

1. A joint for articulated shoring for use underground comprising on at least one of the members to be jointed a part-cylindrical pivot socket to fit the corresponding cylindrical surface of a pivot pin that is either secured to the other of the members to be jointed or serves to fit also another part-cylindrical pivot socket on such other member, together with two ring-like safety members each adapted to be applied to one of the ends of the pin-and-socket assembly and there to embrace loosely projections on each of the two members to be jointed, so

as to prevent any appreciable relative displacement of the two members in directions transverse to the axis of the pivot, whilst permitting articulation of the members about that axis.

2. A joint as in Claim 1, wherein the projections to be embraced by the ring-like safety members are formed by the projecting ends of a pivot pin that is secured to one of the members to be jointed, and by abutments formed for the purpose on the other of such members.

3. A joint as in Claim 1, wherein the projections to be embraced by the ring-like safety members are formed by the projecting ends of socket parts of the two members to be jointed, or by reinforcing abutments applied to the projecting ends.

4. A joint as in Claim 1, wherein the projecting ends of socket parts of the two members to be jointed carry retaining members to prevent axial displacement of a pivot pin fitted between the two sockets, when the retaining members constitute the projections to be embraced by the ring-like safety members.

5. A joint as in any of Claims 1 to 4, comprising means to prevent accidental removal of the safety members from the projections.

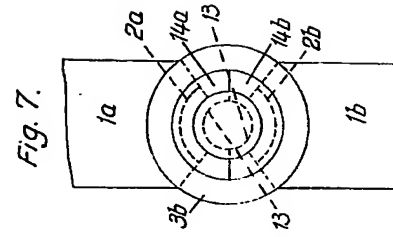
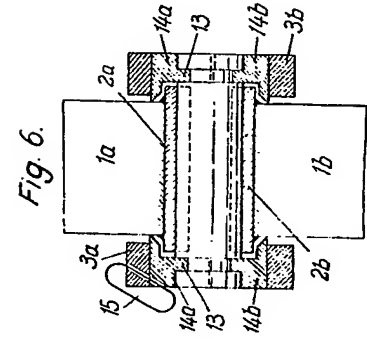
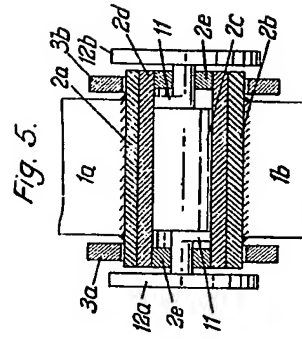
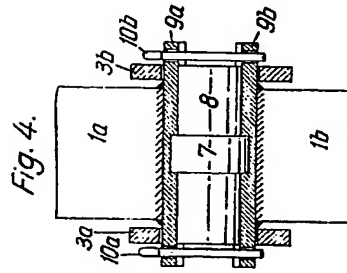
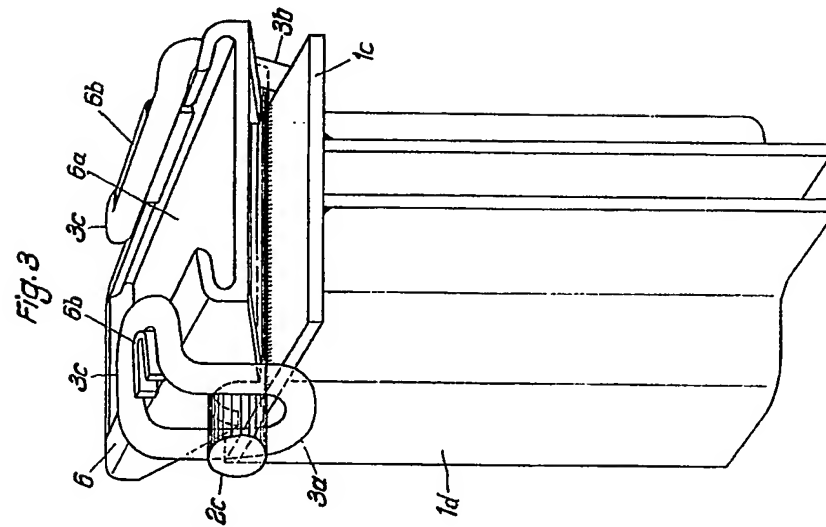
6. A joint as in Claim 5, wherein the projecting ends of socket parts, and any reinforcing abutments of such parts have holes to receive a split pin outside each applied safety member.

7. A joint as in Claim 6, wherein in conjunction with the split pins on the socket part of one of the members to be jointed, the projecting ends of the socket part of the other member have integral (including welded) lugs to lie outside the safety members.

8. A joint as in Claim 5, wherein the ends of the pivot pin are provided with retaining discs larger in diameter than the bores of the ring-like safety members, bayonet connections between the pin and the discs providing for application and removal of the latter.

9. Joints for articulated shoring for use underground substantially as hereinbefore described with reference to Figures 1 and 2; Figure 3; Figure 4; Figure 5, and Figures 6 and 7 of the accompanying drawings.

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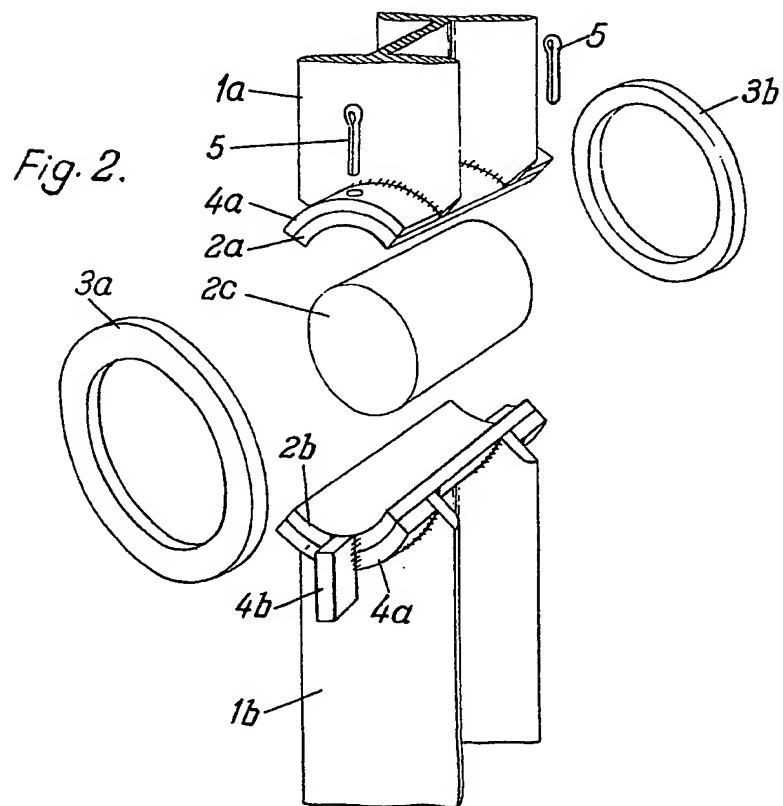
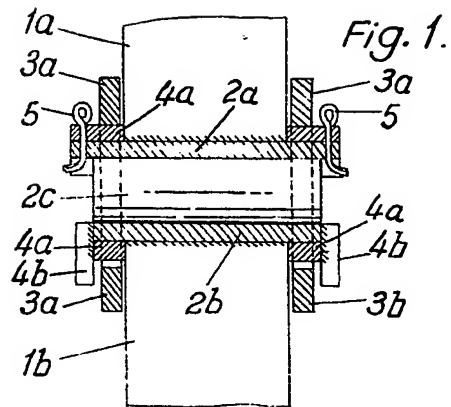
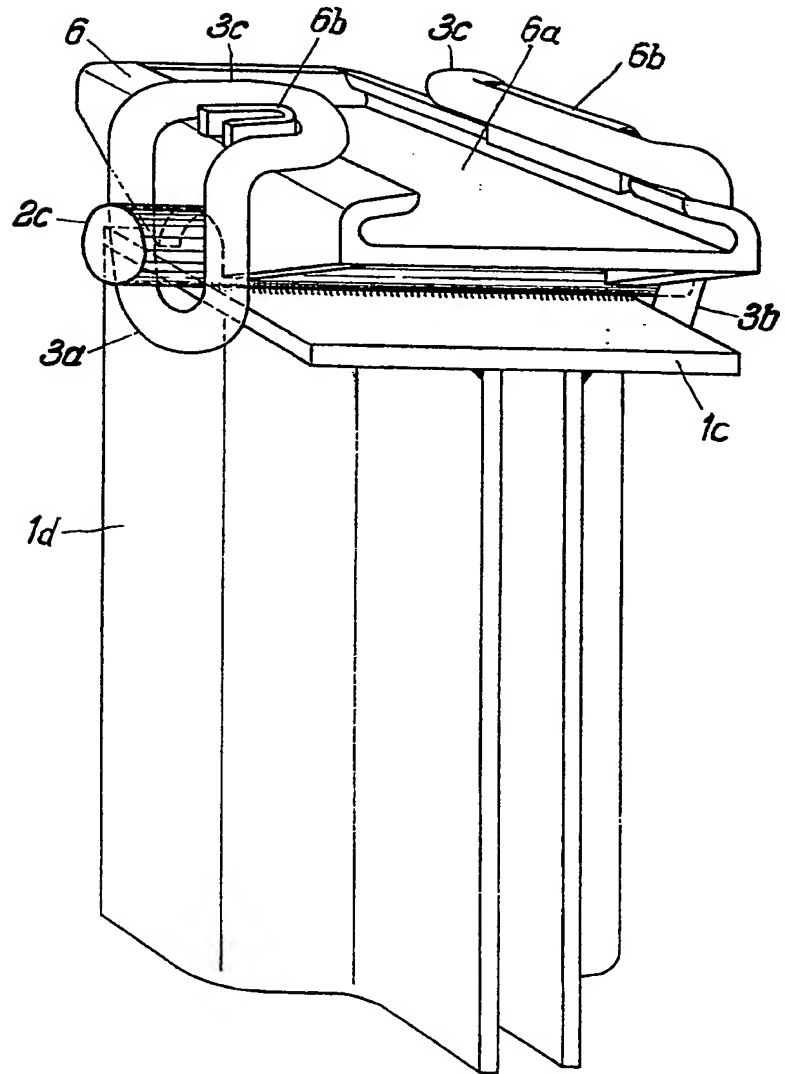


Fig. 3



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3 SHEETS

COMPLETE SPECIFICATION

This drawing is a reproduction of  
the Original on a reduced scale.  
SHEETS 2 & 3

Fig. 4.

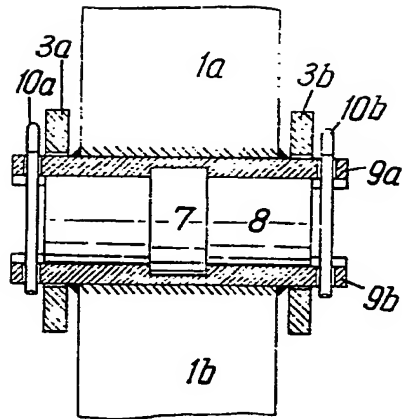


Fig. 5.

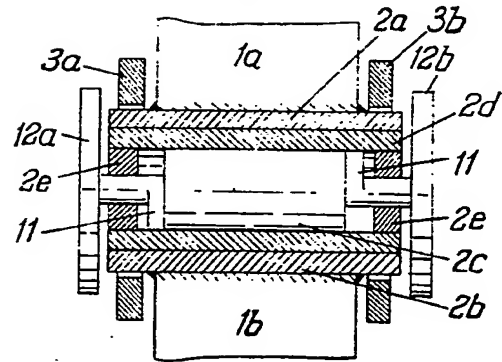


Fig. 6.

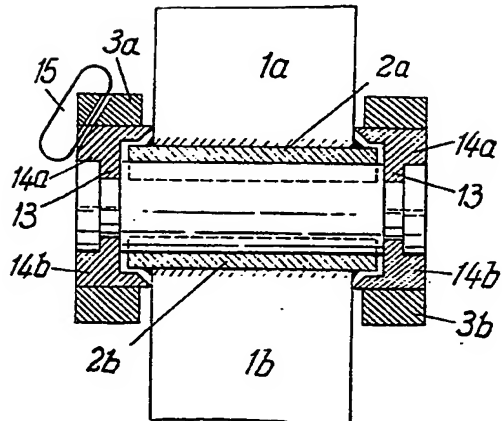


Fig. 7.

